MYRIAPODOLOGICA

Virginia Museum of Natural History

Vol. 6, No. 12 ISSN 0163-5395 August 15, 2000

Two new genera of chelodesmid millipeds from southeastern Brazil (Polydesmida: Chelodesmidae)

By Richard L. Hoffman

ABSTRACT

The new taxon *Atlantodesmus* (type species *Leptodesmus (Odontopeltis) eimeri* Attems, 1898) is proposed to accomodate five species occurring in the coastal mountains of Brazil between Bahia and Santa Catarina. A second new genus *Iemanja* (type species *I. teresa,* n. sp.) is established for an apparently related species in Espírito Santo. These genera are distinguished by the broad, nearly horizontal paranota,widest near the anterior end, as well as by shared similarities in gonopod structure.

INTRODUCTION

During the century after its proposal by Henri DeSaussure in 1859, the genus *Leptodesmus* acquired a membership of more than 100 species, nearly all of them South American. While that number itself is not necessarily excessive, the structural diversity manifested among those species surely guaranteed *Leptodesmus* a leading place in the pantheon of heterogeneous milliped genera.

While a start toward dismantling this great melange was commenced by Otto Schubart in the decade preceeding his untimely death in 1962, the first attempt to associate the name *Leptodesmus* with a defensibly monophyletic small taxon was made by me in 1971 in a paper treating several large and confused groups of Brasilian chelodesmids. The interested reader is referred to that source for an extended discussion of both the groups and the rationale that produced them; for the present it is sufficient to note that by restricting *Leptodesmus* to just 21 Brazilian

species, I effectively deprived nearly a hundred others of any generic affiliation. Simply relocating them *en masse* to the next available generic name did not appear to produce a better situation, and the ideal solution of sorting everything out in a comprehensive revision has proved to be more time consuming than might be wished. The backlog of "Leptodesmus" species of unknown generic position *has* been gradually reduced over the past three decades, but at a rate no one might be proud of.

The present small step in this progression brings six more "Leptodesmus" orphans together under a new generic name, with consideration taken of their distribution and affinities with other chelodesmid taxa (to the extent that current knowledge permits). The occasion is taken to document a closely related new genus based on an interesting new species from Espírito Santo.

Atlantodesmus, new genus

TYPE SPECIES: *Leptodesmus (Odontopeltis) eimeri* Attems, 1898, by present designation.

NAME: A neologism reflecting the virtual restriction of the genus to the Atlantic Biogeographic Province of eastern Brazil.

DIAGNOSIS: Paranota large and nearly horizontal, set high on sides to produce a nearly plane dorsal surface, widest near anterior end of body; peritremata large, set off abruptly from scapuloral margin, forming posterior corner of paranota, pores opening laterally. Legs long, unmodified, without subtarsal pads or other modification in males. Anterior sterna either with or without low, paramedian setose knobs.

Gonopod aperture large, transversely oval, posterior edge reflexed posteriad onto sternum of 7th segment but without paramedian ridges. Gonopods with large and prominent median sternal element; coxae large, moderately produced laterally but not concealing base of prefemora, distal edge on the dorsal side produced into a small, acute projection presumably homologous to the coxal apophysis in other chelodesmoid taxa. Telopodites large, set against coxa at about a 120° angle; prefemora slender, with large, elongated unbranched process on dorsal side; acropodite not set off by a basal cingulum, recurved dorsal, apex slightly broadened; no trace of torsion evident, prostatic groove visible for most of its length, solenomere large, falcate.

AFFINITIES: As usual for so many diplopod genera, the species of *Atlantodesmus* express both plesiomorphic and apomorphic conditions in different character systems. Retention of the median gonosternum and lack of secondary sexual modifications in the males are apparently generalized for the family, while the enlarged gonopod aperture, presence of both a gonocoxal apophysis and a long solenomere near midlength of the telopodite, and high, broad paranota suggest

derived traits. The modified limbus in both this genus and the next is very similar to that occurring in *Leiodesmus* and related genera in the Parana River basin, as is the general size and shape of the gonopod aperture.

The highly placed, horizontal, broadened paranota are shared, albeit in a slightly different form, with the following genus and reinforce the similarities between the two expressed in gonopod structure. Possibly the relationship could be formalized by tribal status when the fauna of eastern Brazil has been more thoroughly studied.

RANGE: Southeastern Brazil between Bahia and Santa Catarina, with only one exception confined to the coastal mountain ranges (Fig. 1).

SPECIES: Five.

Atlantodesmus buecherli (Schubart), new combination

Leptodesmus buecherli Schubart, 1955, Arq. Mus. Nac., 42: 514, fig. 1. Male holotype (MZUSP) from Sant'Ana district, São Paulo, S. P., Brazil, W. Bücherl leg. 1940.

In general gonopod characters, this species most closely resembles *A. pickeli*, also described from the northern suburbs of São Paulo, but is only about half the size of that species.

Atlantodesmus eimeri (Attems), new combination
Figures 3-7, 12

Leptodesmus (Odontopeltis) Eimeri Attems, 1898, Denks. Akad. Wien, 67: 400, fig. 151. Four syntypes (NMW!) from Blumenau, Santa Catarina, Brazil, L. Hettsckko leg. 5 February 1889.

Pseudoleptodesmus (Brachyurodesmus) eimeri: Attems, 1931, Zoologica, 30(3-4): 34, figs. 50-53.

Leptodesmus (Leptodesmus) verhoeffi Attems, 1931, Zoologica, 30 (3-4): 17, figs. 18-21. Male holotype (ZMH!) from "Flußgebiet des Jtapocu und Ort Isabelle", Santa Catarina, Brasil; W. Erhardt leg. Synonymized with *L. eimeri* Attems, 1898, by Schubart, 1954.

Leptodesmus (Leptodesmus) verhoeffi: Attems, 1938, Das Tierreich, 69: 21, fig. 19.

Leptodesmus (Brachyurodesmus) eimeri: Attems, 1938, Das Tierreich, 69: 47, figs. 53, 54.

Leptodesmus eimeri: Schubart, 1946, An. Acad. Brasil. Cien., 18: 192.

Leptodesmus verhoeffi: Schubart, 1946, An. Acad. Brasil. Cienc. 18: 196.

Leptodesmus eimeri: Schubart, 1954, Arq. Mus. Paranaense, 10(3): 99, fig. 19.

DESCRIPTION (from Attems, 1898): Male uniformly dark brown, almost black, dorsally; paranotal margins, legs, antennae, and undersides yellowish brown. Female somewhat lighter reddish brown.

Male 43 mm long, 7.5 mm wide at midbody (W/L 17%), female 50 mm long, 8 mm wide (W/L 16%). Body scarcely narrowed anteriad, distinctly so posteriad. Body surface matte, glabrous except for legs and sterna.

Antennae long and slender, not distally thickened, extending to caudal edge of 4th segment. Collum slightly convex, broader than head, anterior and lateral edges forming continuous arc, lateral ends acute, posterior edge shallowly trisinuate. Paranota set high on sides, middorsum nearly flat in males, slightly convex in females. Dorsal surface of segments finely granular to coriacious, posterior two-thirds of metaterga with three transverse rows of small granules, 12-14 in each row .

Anterior corners of paranota rounded, lateral edge straight, not forming an arc with anterior edge. Posterior corner obtuse on first several segments, distinctly acute from 5th onwards, and formed by posteror end of the peritreme on poriferous segments (Fig. 12). Pores large, placed near center of the ovoid peritremata, directed laterad. Posterior corner increasingly acute back to 18th segment, paranota of 19th reduced to mere rounded lobes. Hypoproct triangular, apically produced into a small acumen which follows the curvature of the paraproctal commissure. Sterna with fine transverse groove, set with a few fine setae.

Gonopod aperture (Fig. 3) large, transversely oval, the posterior rim broad and appressed against sternum between 8th legs, internal posterior edge with a small acute median projection. Gonopods (Figs. 4-7): coxae of moderate size, only slightly produced laterally, distal edge with a small acute projection, subtended by a single row of setae; telopodite slender, recurved dorsad, prefemoral process as long as acropodite, distally laminate but unbranched; acropodite distally broadened but not branched, with long falcate solenomere at about midlength on dorsal side.

SYNONYMY: Attems' redescription of this species (1931) under the name *Leptodesmus verhoeffi*, in a genus different from that (*Pseudoleptodesmus)* in which he placed *eimeri*, can be explained by the fact that the gonopod of *eimeri* was drawn from a ventral aspect and therefore looked quite different from the mesal aspect chosen for *verhoeffi*. The nominal characteristic cited for *Pseudoleptodesmus* (greater lateral production of the gonocoxa) is actually illusory. The drawings given here, made from the same aspect, of the two respective type specimens, shows that they are essentially identical, and support the conclusion already drawn by Schubart (1954: 100) that the two names are synonymous.

DISTRIBUTION: Eastern part of Santa Catarina and Parana (Fig. 1).

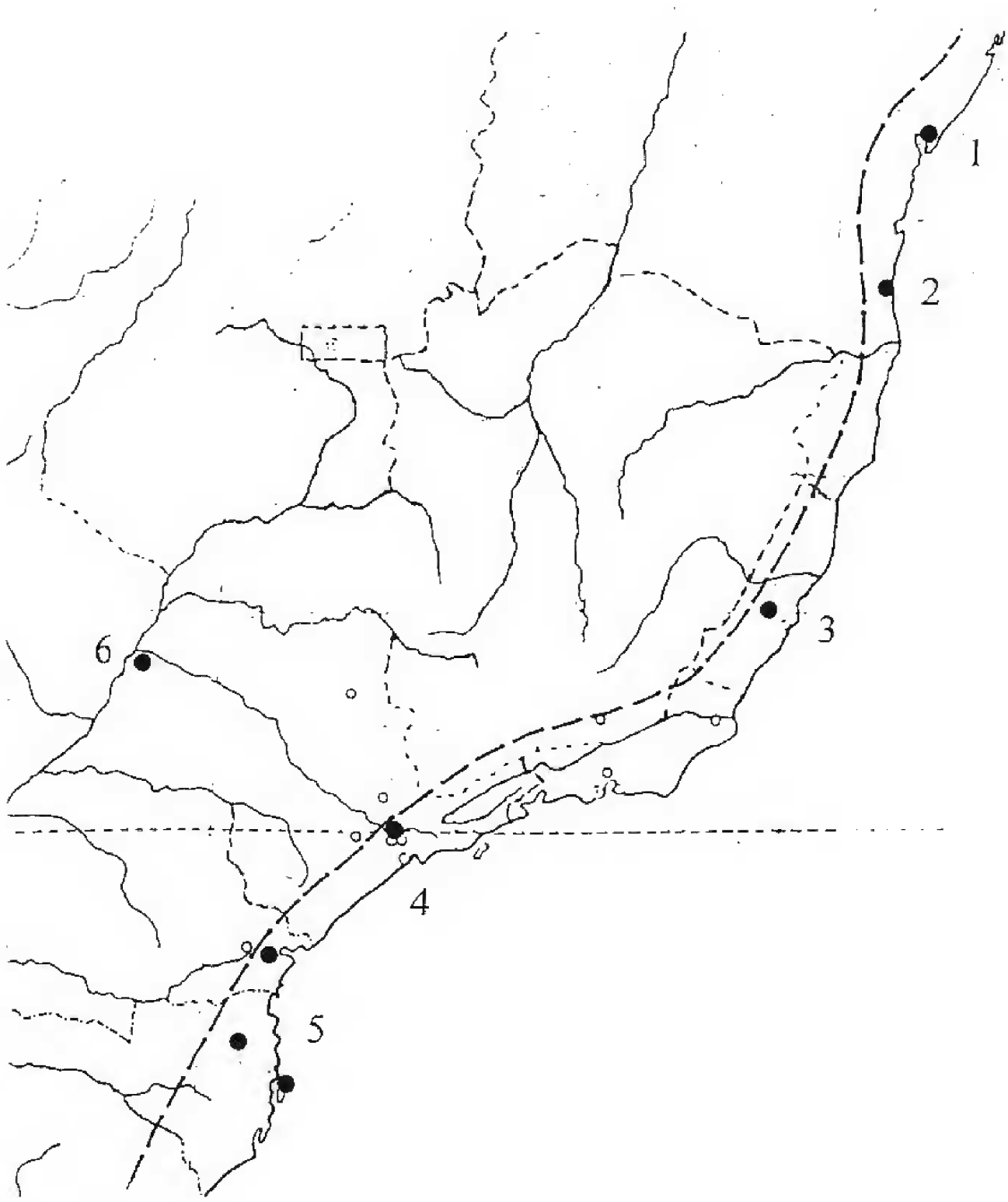


Fig. 1. Eastern Brazil, showing known localities for the species of *Atlantodesmus* and *Iemanja*. Limits of the Atlantic Province approximated by the dashed line. 1, "Bahia" [=Salvador?], possible locality for *Iemanja teresa*. 2. Ilheus, Edo. Bahia, *Atlantodesmus pintoi*. 3. Santa Teresa, Espiritu Santo, type locality for *I. teresa*. 4. São Paulo (city), type locality for *A. buecherli* and *A. pickeli*. 5. Localities in Parana and Santa Catarina for *A. eimeri*. 6. Itapura, São Paulo (state), type locality for *A. itapurensis*. Confirmation of the last seems indicated.

Atlantodesmus itapurensis (Schubart), new combination

Leptodesmus itapurensis Schubart, 1943, Pap. Avuls. Zool., 3: 148, fig. 1. Male holotype (Inst. Oswaldo Cruz) from Itapura, Mun. Andradina, São Paulo, Brasil.

Atlantodesmus pickeli (Schubart), new combination

Leptodesmus pickeli Schuabrt, 1946, An. Acad. Cienc. Brasil., 18: 166, fig. 1. Male holotype (Inst. Butantan) from Casa Verde district, São Paulo, S. P., Brazil; D. B. J. Pickel leg. 1939.

Atlantodesmus pintoi (Schubart), new combination

Leptodesmus pintoi Schubart, 1946, An. Acad. Brasil. Cienc., 18: 166, fig. 2. Male holotype (MZUSP) from Ilheus, Edo Bahia, Brazil, E. Garbe leg. 1919.

Iemanja, new genus

TYPE SPECIES: *I. teresa*, new species.

NAME: "Iemanja" is goddess of the sea in the Candomble religion of eastern Brazil.

DIAGNOSIS: Large, broad, dorsally flat species; paranota nearly horizontal, greatest body width at segment 4, thence tapering gradually posteriad. Peritremata large but flattened mesodorsad, not set off from lateral edge of paranota; posterior edge of paranota convex, forming a prominent basal lobe . Anterior legs and sterna of males without modifications. Male gonopore opening flush on surface of coxae of 2nd legs.

Gonopod aperture large, transversely oval, posterior margin extended only slightly between coxae of 8th legs, inner surface produced mesially into an acute projection, with 3-4 paramedian ridges/knobs. Gonosternum large, prominent; coxae of moderate size, slightly produced on lateral side but not concealing base of telopodite, distal edge with a small acute apophysis. Telopodite slender, curved dorsad, prefemoral region more or less continuing median axis of coxa, with long unbranched dorsal process; acropodite not set off from prefemur, but with a distinct cingulum on lateral side proximad to origin of solenomere, latter slender, acuminate, apically enveloped by tibiotarsal region of telopodite.

Female unknown.

REMARKS: While the gonopods in this genus are remarkably similar to those of *Atlantodesmus*, a significant difference is offered by the presence in *I. teresa* of a

well-defined cingulum on the lateral side of the telopodite, just proximad the origin of the solenomere (Fig. 14, →). It is therefore tempting to look for a possible relationship with the genus *Arthrosolaenomeris* (Schubart, 1943), in which a large gonosternum and a cingulum are likewise present. I believe, however, on the basis of the entirely different peripheral facies of these two genera, that the telopodite cingulum is better regarded as a homoplasy that recurs randomly in certain clades of the Chelodesmidae (it is characteristic of the distantly related tribe Batodesmini, for instance). A relationship within tribal limits cannot safely be asserted at present for *Iemanja* vis-a-vis *Arthrosolaenomeris*.

The presence of paramedian knobs/ridges on the posterior surface of the gonopod aperture is a character shared with *Leiodesmus* and related genera, the species of which occur southward along the Rio Parana in Paraguay and Bolivia. Although this feature is perhaps a functional modification associated with large gonocoxae, its possible predictive value should not be overlooked.

Range: Known definitely only from the coastal mountains of Espírito Santo (but probably also those of Bahia).

Iemanja teresa, new species
Figures 2, 8-11, 13-15

MATERIAL: Male holotype (MZUSP 565) from Santa Teresa (19.55S, 40.36W), Espírito Santo, Brasil, 10 January 1964 (collector not specified). Male paratype (ZMUC) from "Bahia" without further data (see comments under "Remarks" below).

NAME: From the type locality; thus indirectly for Saint Theresa of Avila.

DIAGNOSIS: With the characters of the genus; any additional species will be distinguished by differences in details of gonopod structure.

HOLOTYPE: Adult male, ca. 67 mm long (fragmented), body outline distinctive, widest at segments 4-6, thence narrowing gradually and evenly posteriad, widths of representative segments:

segment 1 - 11.8 mm	segment 8 - 14.2 mm
" 2 - 13.0	" 12 - 13.5
" 4 - 14.4	" 14 - 12.0
" 6 - 14.6	" 16 - 11.5

W/L ratio at segment 6, 22%, at segment 12, 20%. Paranota set high on sides and nearly horizontal, width as great as diameter of body cavity (Fig. 11); middorsum only slightly convex .

Head smooth and unmodified, width across mandibles 7.0 mm, across genal apices, 5.7 mm, interantennal space 2.0 mm. Genae with shallow median impression, not laterally margined but with a marginal row of several small setae. Facial setae

mostly abraded. Antennae long (ca. 12.3 mm) and slender, extending back to 5th paranota; 2nd article longest, 3-5 nearly as long, subequal, 6th about equal to 1st, 7th with sensory cones in two distinct diads.

Collum (Fig. 8) transversely ellipsoid, laterally declivous and acutely narrowed. Paranota of segments 2 and 3 less declivous, those of 4th and subsequent segments nearly horizontal (Fig. 11, their width equal to or greater than diameter of the prozona.. Dorsal surface of segments smooth to the eye, with magnification minutely coriarious, without evident transverse rows of small tubercles on anterior terga, one or two rows of very small granules on last several segments; no transverse sulcus or other modification. Stricture smooth, its anterior edge sharply defined entirely around segments. Limbus broad, hyaline, with numerous submarginal elevated filiform projections. Paranota large, their length greater than middorsal length of metaterga, anterior edge forming a broad even curve, posterior edge convex, curved anteriad to contact with body cylinder, on segments 14-17 a prominent rounded lobe is formed at that point (Fig. 10 →), probably diagnostic for this genus, both anterior and posterior edges with thin but sharply-defined rim. Peritremata broad and flat, extended mesad with pore set in a small concavity near inner edge (Fig. 9). Posterior corners increasingly acute posteriad as usual. Epiproct slender, acute, without modifications. Paraprocts smooth, only slightly convex, with prominent mesal margins. Hypoproct subtriangular, with very small paramedian tubercles, median apex produced as a subtriangular projection, curved dorsad along curvature of paraproctal margins. Coxae of last pair of legs almost in contact, sterna relatively narrow (about equal to length of prefemora) at midbody, elevated into podosterna somewhat removed from caudoventral edge of segments, without trace of subcoxal spines or paramedian knobs. Sides of metazona microcoriarious, without pleurosternal ridge or other modification. Legs long and slender, extending far beyond lateral edges of paranota, podomeres smooth and very sparsely setose.

Anterior sterna less than coxal width on segment 6, and only half that distance on 3rd-5th, without processes. Gonopore placed on mesal side of a very low, beveled conic end of 2nd coxae. Anterior legs unmodified.

Gonopod aperture (Fig. 2) with paramedian ridges on posterior surface. Gonopods as described under the generic heading, and illustrated in Figs. 13-15.

REMARKS: The label with the Bahia specimen carries the information "Chr.viii" which Professor Enghoff advises me signifies King Christian VIII, a well-known collector of natural history materials. It is therefore quite possible that the specimen was collected by the Danish naturalist Carl Kiellerup, who was commissioned by Christian to be the entomologist on the *Galathea* Expedition. As the last stop on its circumnavigation of the world, the *Galathea* put in at the port of Bahia (now Salvador), suggesting the vicinity of that city (rather than the state itself) as a likely collecting site. This possibility would imply a fairly extensive north-south range of

over 720 km for this species; further collecting may resolve the situation.

ACKNOWLEDGMENTS

Several colleagues generously provided access to or loan of materials on which this paper is based: Prof. Henrik Enghoff, Zoologisk Museum, Copenhagen (ZMUC); Dr. Jürgen Gruber, Naturhistorisches Museum, Wien (NMW); Dr. J. C. Leme, Museu de Zoologia, Universidad de São Paulo (MZUSP), and Dr. Gisela Rack, Zoologisch Museum, Hamburg (ZMH). Dr. Enghoff and Dr. Verena Stagl (Wien) kindly responded to requests for information on several points. Research supported by a grant (DB-9712438) from the National Science Foundation to Drs. Petra Sierwald and William A. Shear.

LITERATURE CITED

Attems, C. 1898. System der Polydesmiden. Teil I. Denkschr. Akad. Wiss. Wien, 67: 221-482.

Attems, C. 1931. Die Familie Leptodesmidae und andere Polydesmiden. Zoologica 30(3-4): 1-149.

Attems, C. 1938. Fam. Leptodesmidae, Platyrhachidae, Oxydesmidae, Gomphodesmidae, in Das Tiereich, 69: 1-487.

Hoffman, R. L. 1971. Chelodesmid studies V. Some new, redefined, and resurrected Brasilian genera. Arq. Zool. São. Paulo, 20(4): 225-277.

Schubart, O. 1943. Espécies novas das familias Strongylosomidae e Leptodesmidae da ordem Proterospermophora do interior dos Estados de São Paulo e da Mato-Grosso. Pap. Avuls. Dept. Zool. São. Paulo, 3: 127-164.

Schubart, O. 1946. Contribuição ao conhecimento do gênero *Leptodesmus* (Fam. Leptodesmidae, Diplopoda). An. Acad. Brasil. Cienc., 18: 165-202.

Schubart, O. 1954. Sôbre os Diplopoda dos Estados do Paraná e Santa Catarina. Arq. Mus. Paranaense, 10: 77-140.

Schubart, O. 1955. Materiais para uma fauna do Estado de São Paulo – os Leptodesmidae. Arq. Mus. Nac. 42: 507-540.

Address of the author:

Dr. Richard L. Hoffman
Virginia Museum of Natural History
Martinsville, Virginia 24112, USA

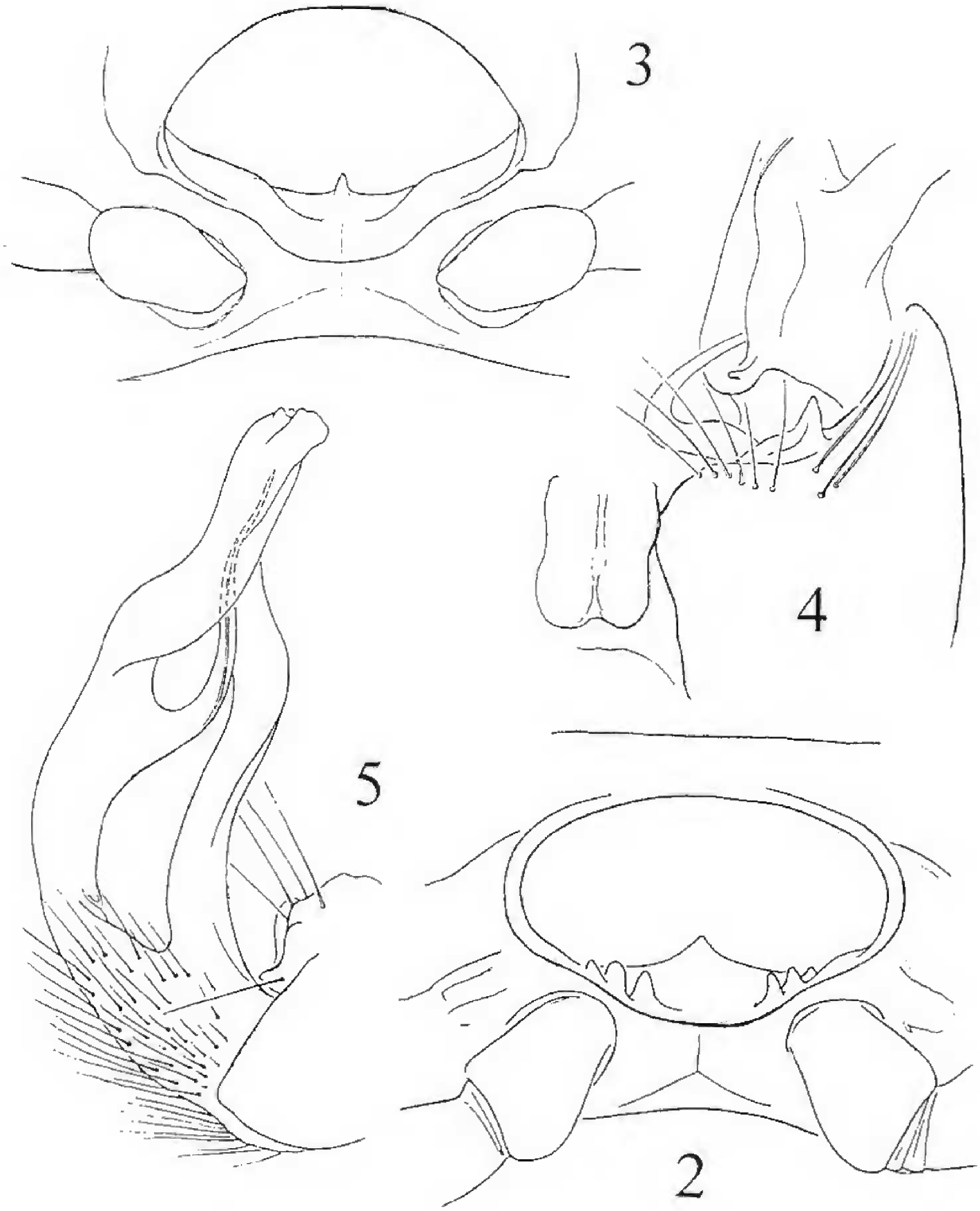


Fig. 2. *Iemanja teresa,* ventral view of 7th segment showing paramedian ridges on caudal surface of aperture. Fig. 3. *Atlantodesmus eimeri*, ventral view of 7th segment. Fig. 4. The same, dorsal spect of coxae and basal telopodite of right gonopod showing sternum and rudimentary coxal apophysis. Fig. 5. The same, lateral aspect of left gonopod. All drawings from holotypes.

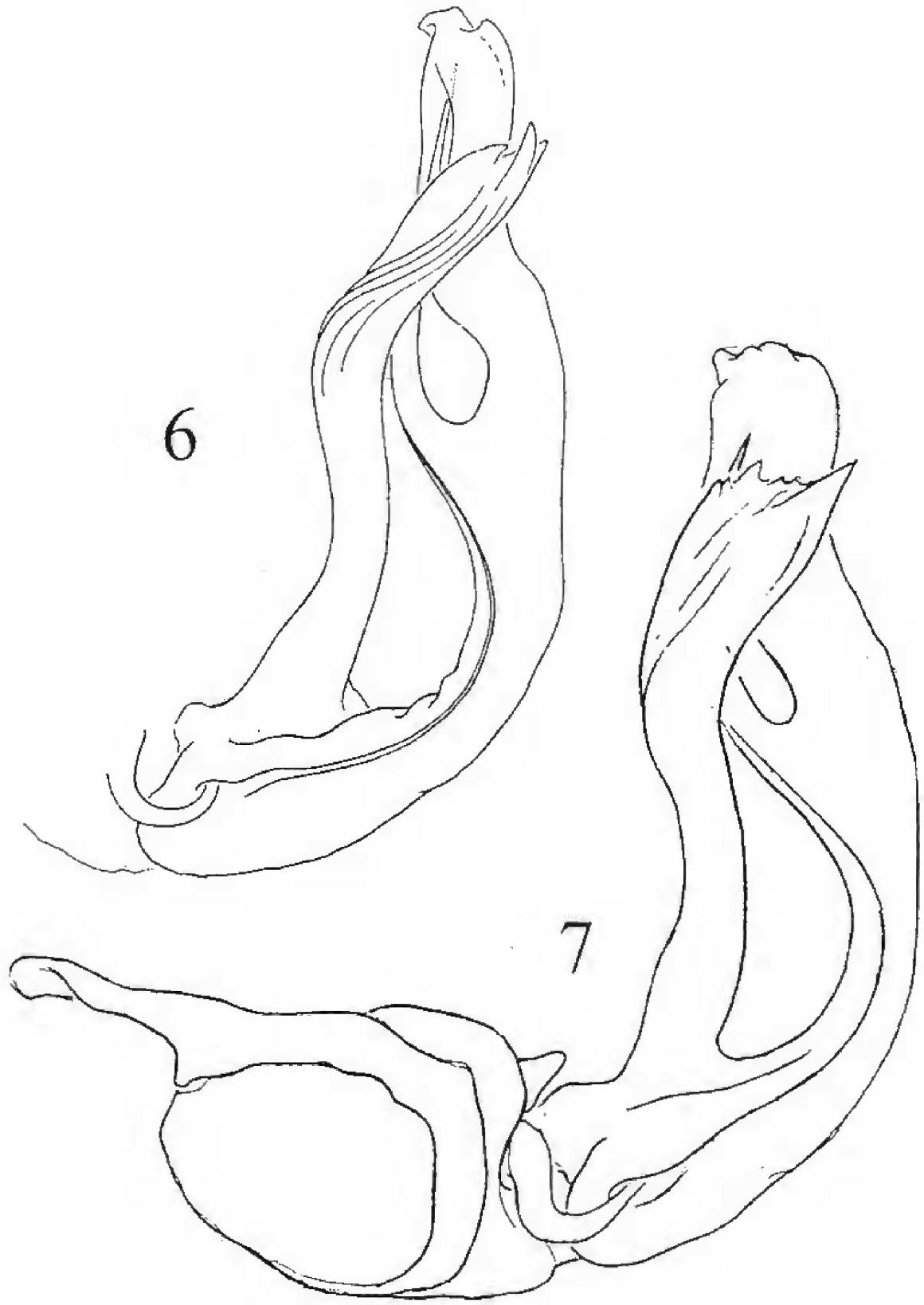
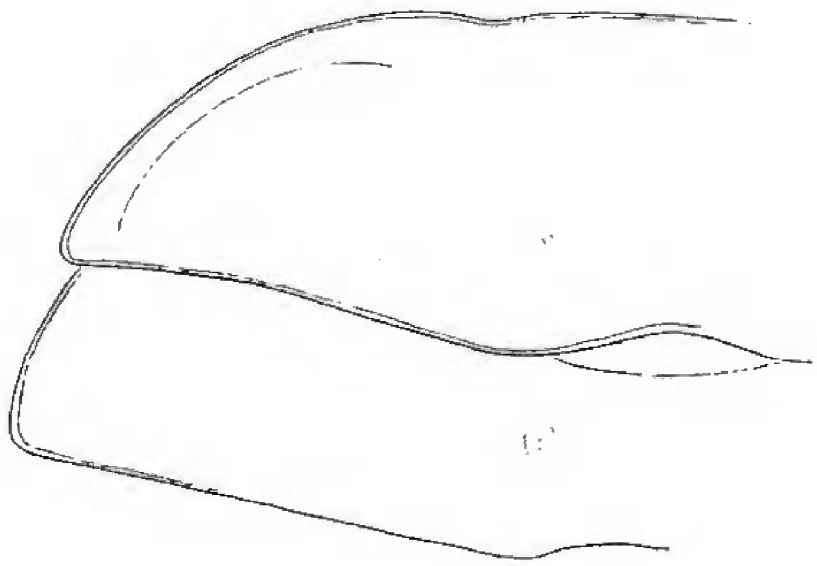
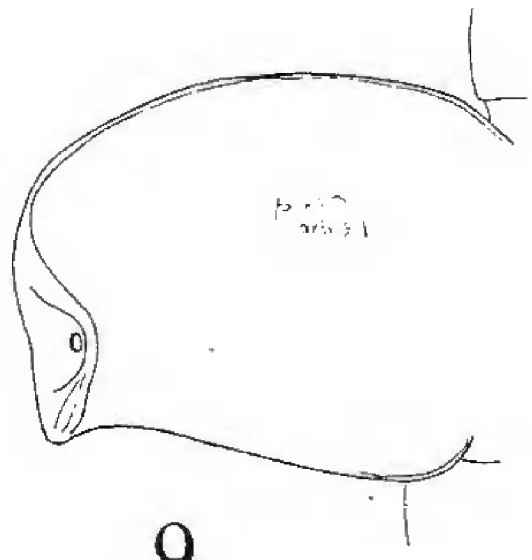


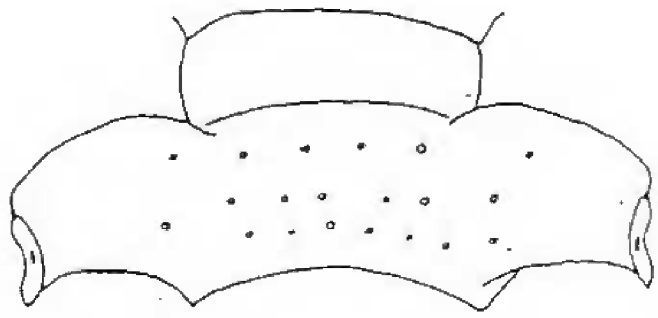
Fig. 6. Left gonopod of *A. eimeri*, median aspect, from holotype. Fig. 7. The same, from holotype of *Leptodesmus verhoeffi*.



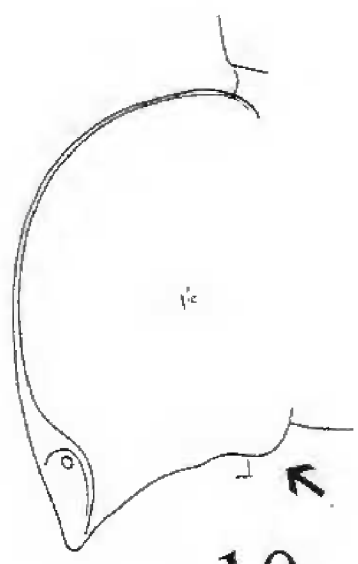
8



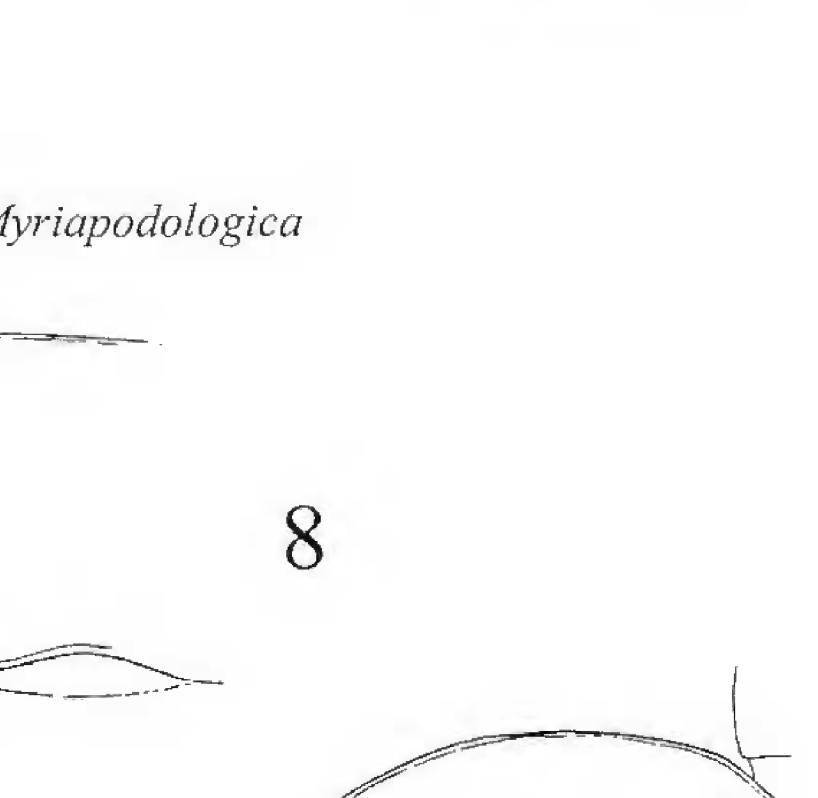
9



12



10



11

Fig. 8. *Iemanja teresa,* left side, dorsal aspect, of collum and 2nd paranotum. Fig. 9. The same, left paranotum of 9th segment. Fig. 10. The same, left paranotum of 16th segment, showing basal lobe of posterior edge (→). Fig. 11. The same, posterior aspect of left side of 4th segment. Figs. 8-11 from holotype. Fig. 12. *Atlantodesmus eimeri*, dorsal aspect of midbody segment, from Attems, 1931.

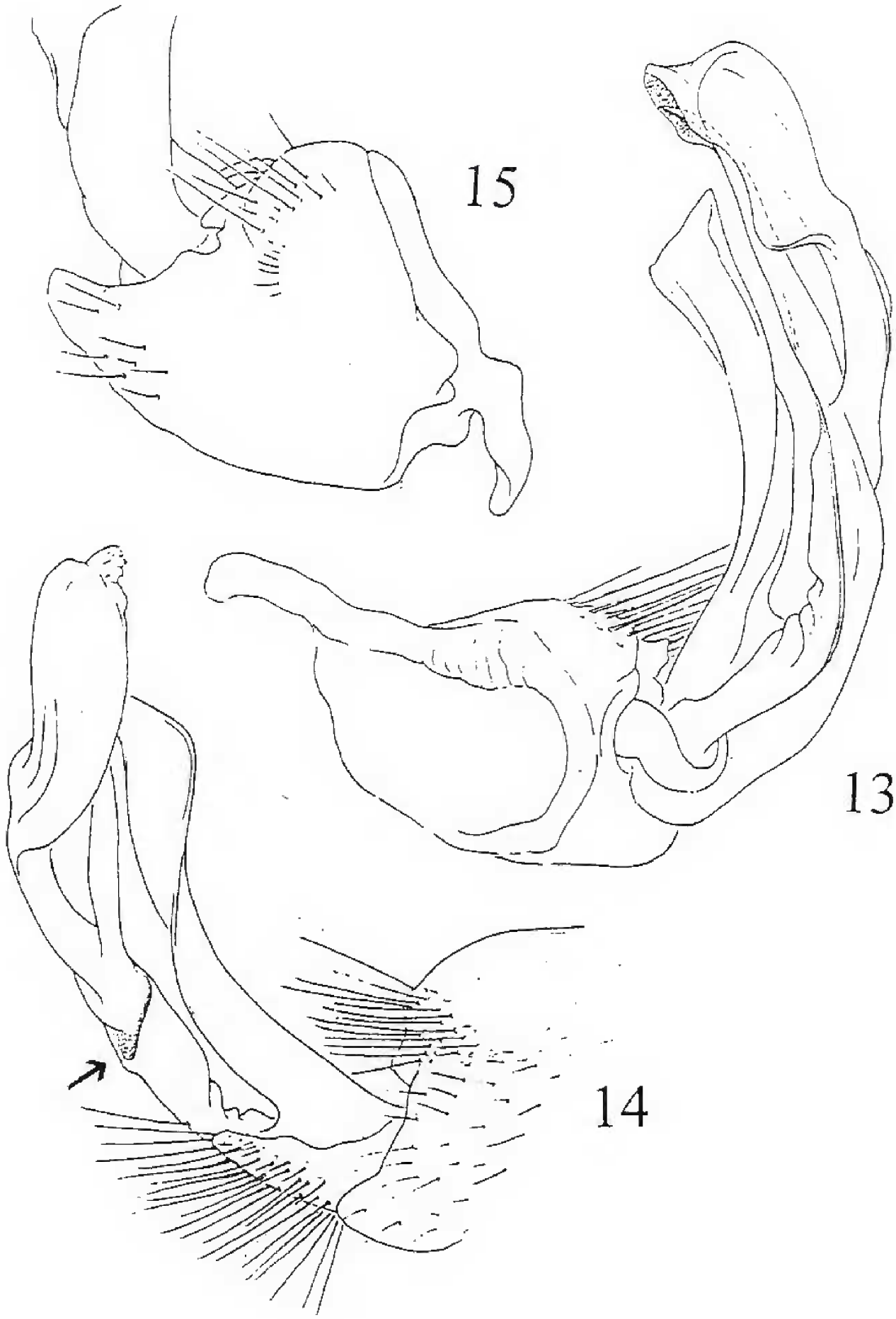


Fig. 13. *Iemanja teresa,* left gonopod, mesal aspect. Fig. 14. The same gonopod, lateral aspect, showing prominent cingulum of telopodite (→). Fig. 15. The same gonopod, anterolateral aspect of coxa emphasizing distal elongation and shape of the coxosternal apodeme.